



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2010–0077]

[4500030113]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Spring Mountains Acastus Checkerspot Butterfly as an Endangered or Threatened Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the Spring Mountains acastus checkerspot butterfly (*Chlosyne*

acastus robusta) as an endangered species under the Endangered Species Act of 1973, as amended (Act). After review of the best available scientific and commercial information, we find that listing the Spring Mountains acastus checkerspot butterfly is not warranted at this time. However, we ask the public to submit to us any new information that becomes available concerning the threats to the Spring Mountains acastus checkerspot butterfly or its habitat at any time.

DATES: The finding announced in this document was made on [INSERT DATE OF FEDERAL REGISTER PUBLICATION].

ADDRESSES: This finding is available on the internet at <http://www.regulations.gov> at Docket Number **FWS-R8-ES-2010-0077**. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, 4701 North Torrey Pines Drive, Las Vegas, NV 89130. Please submit any new information, materials, comments, or questions concerning this finding to the above street address.

FOR FURTHER INFORMATION CONTACT: Edward D. Koch, Field Supervisor, Nevada Fish and Wildlife Office (see **ADDRESSES**); by telephone at 775-861-6300; or by facsimile at 775-861-6301 <mailto:>. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq.*) requires that, for any petition to revise the Federal Lists of Threatened and Endangered Wildlife and Plants that contains substantial scientific or commercial information that listing a species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding we will determine that the petitioned action is: (1) Not warranted; (2) warranted; or (3) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are an endangered or threatened species, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Actions

On September 18, 2009, we received a petition dated September 16, 2009, from Bruce M. Boyd requesting that the Spring Mountains acastus checkerspot butterfly (*Chlosyne acastus robusta*) be listed as an endangered species under the Act. Included in

the petition was information regarding the species' taxonomy, historical and current distribution, present status, and potential causes of decline. We acknowledged the receipt of the petition in a letter to Bruce M. Boyd, dated November 24, 2009. In that letter, we responded that we had reviewed the information presented in the petition and determined that issuing an emergency regulation temporarily listing the butterfly under section 4(b)(7) of the Act was not warranted (Service 2009, p. 1). We also stated that funding was secured and that we anticipated making an initial finding in fiscal year 2010 as to whether the petition contained substantial information indicating that the action may be warranted. On April 13, 2011, we published a 90-day petition finding (76 FR 20613) in which we concluded that the petition and information in our files provided substantial information indicating that listing the Spring Mountains acastus checkerspot butterfly may be warranted, and we initiated a status review. This notice constitutes the 12-month finding on the September 16, 2009, petition to list the Spring Mountains acastus checkerspot butterfly.

Taxonomy and Subspecies Description

William Henry Edwards (1874, pp. 16–17) provided the first descriptions of the sagebrush checkerspot butterfly (*Chlosyne acastus* (= *Melitaea acastus*)) from specimens collected during the Hayden expedition of 1871, Wheeler expedition of 1872, and by Henry Edwards, Esq. (Brown 1966, pp. 402–405). Specimens collected earlier by Edwards and named *Melitaea sterope* (Edwards 1870, pp. 190–191) were considered a subspecies of northern checkerspot butterfly (*Chlosyne palla*), but were subsequently

considered conspecific with sagebrush checkerspot butterflies (Pelham 2008, p. 379). Other synonyms of the genera *Chlosyne* used with the species *acastus* have included *Charidryas* and *Lemonias* (Dyar 1903, pp. 17–18; Opler and Warren 2003, pp. 35–36; Pelham 2008, pp. 379–380).

Since Edwards' first descriptions of the species in 1870 and 1874, nine subspecies of sagebrush checkerspot butterfly have been named and are listed by Pelham in "A catalogue of the butterflies of the United States and Canada with a complete bibliography of the descriptive and systematic literature" published in volume 40 of the Journal of Research on the Lepidoptera (2008, pp. 379–380). The common names, *acastus* and sagebrush checkerspot butterflies, have been used interchangeably in the literature for species and subspecies; however, throughout this finding sagebrush checkerspot butterfly will be used to reference the species (*Chlosyne acastus*) and *acastus* checkerspot butterfly will be used to reference the subspecies (*C. a. acastus*). The other subspecies in the 2008 Pelham catalogue include: no common name (*C. a. arkanyon*); Dorothy's checkerspot butterfly (*C. a. dorothei*); Neumoegen's checkerspot butterfly (*C. a. neumoegeni*); Spring Mountains *acastus* checkerspot butterfly (*C. a. robusta*); Sabina checkerspot butterfly (*C. a. sabina*); no common name (*C. a. sterope*); Death Valley checkerspot butterfly (*C. a. vallismortis*); and no common name (*C. a. waucoba*) (Bauer 1975, pp. 157–158; Garth and Tilden 1986, p. 82; Davenport 2004, p. 15; Pelham 2008, pp. 379–380).

Large expanses of desert geographically separate the Spring Mountains *acastus* checkerspot butterfly from all other sagebrush checkerspot butterfly populations and

subspecies, with the exception of Neumoegen's checkerspot butterflies, which have a range that is adjacent to the Spring Mountains acastus checkerspot butterfly (Austin 1998, p. 577). Biologically, the Spring Mountains acastus checkerspot butterfly is largely separated from the Neumoegen's checkerspot butterfly by different flight periods with only a brief period of potential overlap. Neumoegen's checkerspot butterflies have previously been considered a distinct species (Ehrlich and Ehrlich 1961, p. 135; dos Passos 1969, p. 118; Bauer 1975, p. 158; Austin and Austin 1980, p. 40). In addition to a later flight period, Neumoegen's checkerspot butterflies use different larval host plants than Spring Mountains acastus checkerspot butterflies (Austin and Leary 2008, p. 102). While this may currently assist with classifications (Ackery 1988, pp. 95–203), the use of larval host plants to identify butterflies to the species or subspecies level may not be conclusive because host plant relationships may be evolutionarily dynamic, meaning that host plant use may change during the evolutionary process (Wahlberg 2001, p. 530). Details of Spring Mountains acastus checkerspot butterfly's biology and life history are provided below.

Subspecies of adult sagebrush checkerspot butterflies have similar morphological characteristics. The wingspan of adult sagebrush checkerspot butterfly species may range from 1.2–1.5 inches (in) (3.0–3.8 centimeters (cm)) (Opler 1999, p. 299). The upperside of the wing is a spider-web-like pattern of orange and black (Layberry *et al.* 1998, p. 187). The hindwing underside has bands of mostly creamy white and orange-red spots (Layberry *et al.* 1998, p. 187) with dark margins. The forewing underside is primarily orange. In addition, male and female sagebrush checkerspot butterflies are similar in

appearance (Layberry *et al.* 1998, p. 187). While there are similarities amongst the subspecies of sagebrush checkerspot butterflies, there are subtle variations, which were described by Austin 1998 (p. 577), that distinguish the Spring Mountains acastus checkerspot butterfly from other nearby subspecies.

In his description of the adult Spring Mountains acastus checkerspot butterfly, Austin 1998 (p. 577) compares it to the acastus checkerspot butterfly, Death Valley checkerspot butterfly, and the Neumoegen's checkerspot butterfly. Compared to the acastus checkerspot butterfly, the Spring Mountains acastus checkerspot butterfly is described as being larger in size, having a more orange than yellow aspect, and having broader black marks and less basal black on the upperside of the hindwing (Austin 1998, p. 577). The Spring Mountains acastus checkerspot butterfly has less contrast than the acastus checkerspot butterfly between the darker and paler orange areas on both surfaces, especially for females (Austin 1998, p. 577). In addition, the Spring Mountains acastus checkerspot butterfly is described as having a deeper yellow in the pale areas on the underside of the hindwing than the acastus checkerspot butterfly (Austin 1998, p. 577).

Compared to the Death Valley checkerspot butterfly, the Spring Mountains acastus checkerspot butterfly is larger and deeper orange with less contrast (Austin 1998, p. 577). The Death Valley checkerspot butterfly is yellowish-orange with narrower black markings than the Spring Mountains acastus checkerspot butterfly (Austin 1998, p. 577). The underside of the Spring Mountains acastus checkerspot butterfly has a heavier black pattern towards the outside edge of the wings and has a more orange color, which appears

more washed out (Austin 1998, p. 577). In addition, the lines of checkerspot pattern on the underside near the base of the hindwing are thicker in the Spring Mountains acastus checkerspot butterfly than the Death Valley checkerspot butterfly (Austin 1998, p. 577).

Compared to the Spring Mountains acastus checkerspot butterfly, the Neumoegen's checkerspot butterfly is paler orange with narrower or inconspicuous to absent black lines that run across the wing (Austin 1998, p. 577). In addition the Neumoegen's checkerspot butterfly has more brilliant pale white areas on the underside of the hindwing than the deeper yellow of the Spring Mountains acastus checkerspot butterfly (Austin 1998, p. 577).

The similarities in appearance among and between species of checkerspot butterflies (for example, *Chlosyne acastus*, *C. gabbii*, *C. palla*, and *C. whitneyi*) have led to challenges in distinguishing species and subspecies (Higgins 1960, pp. 395, 421, 426; Ehrlich and Ehrlich 1961, p. 132; Ferris and Brown 1981, pp. 325–326; Scott 1986, pp. 305–307). In addition, there have been specific conflicting taxonomic views about the sagebrush checkerspot butterflies in the Spring Mountains (Austin and Austin 1980, p. 40; Austin 1981, p. 71; Austin 1985, p. 108; Bauer 1975, pp. 155–156; Britten *et al.* 1993, p. 133; Emmel *et al.* 1998, pp. 141–142; Higgins 1960, p. 428; Kons 2000, p. 532).

Austin recognized the Spring Mountains acastus checkerspot butterfly (*Chlosyne acastus robusta*) as a distinct subspecies based on differences in size and wing color characteristics (Austin 1998, pp. 576–577). Austin (1998, p. 576) notes that distinct

phenotypes of *C. acastus* are present in certain montane populations, which provide the context for the designation of subspecies. Another study used phylogenetic, morphological, distributional, and biological information to taxonomically evaluate the Spring Mountains acastus checkerspot butterfly (Kons 2000, p. 2). Kons (2000, pp. 549–555) did not recognize populations of sagebrush checkerspot butterflies in the Spring Mountains as a subspecies due to the similarity of the characters he examined and compared between sagebrush checkerspot butterflies and other checkerspot butterflies. However, there are differences in the geographic distribution or continuity and biological characteristics between the sagebrush checkerspot butterfly population in the Spring Mountains and populations elsewhere that support Austin's (1998, pp. 576–577) designation of the Spring Mountains acastus checkerspot butterfly as a subspecies.

Even though there is conflicting information on the taxonomic designation of the Spring Mountains acastus checkerspot butterfly, Austin (1998, p. 576) is cited as the reference for the subspecies level taxonomic designation for the Spring Mountains acastus checkerspot butterfly in the Integrated Taxonomic Information System (ITIS). The ITIS is hosted by the United States Geological Survey (USGS) Center for Biological Informatics (CBI) and is the result of a partnership of Federal agencies formed to satisfy their mutual needs for scientifically credible taxonomic information. ITIS recognizes the Spring Mountains acastus checkerspot butterfly as a valid subspecies (Retrieved June 18, 2012, from the Integrated Taxonomic Information System on-line database, <http://www.itis.gov>). Based upon the best available information, populations of sagebrush checkerspot butterflies in the Spring Mountains are considered a valid

subspecies and are, thus, a valid taxonomic entity for consideration for listing under the Act.

Distribution

The Spring Mountains acastus checkerspot butterfly is known only from the Spring Mountains in Clark and Nye Counties, Nevada (Austin 1998, p. 577), at elevations ranging from minimums near 1,800 meters (m) (5,900 feet (ft)) to maximums of 2,700 m (8,900 ft) (Weiss *et al.* 1997, p. 17). The majority of observations and habitat for the Spring Mountains acastus checkerspot butterfly occur within the Spring Mountains National Recreation Area (SMNRA), which is managed by the U.S. Department of Agriculture's Forest Service (Forest Service), Humboldt-Toiyabe National Forest. However, one colony occurs on private property bordered by Forest Service-managed lands, and an incidental observation at another location was documented on lands managed by the U.S. Department of the Interior, Bureau of Land Management.

The Spring Mountains acastus checkerspot butterfly occurs throughout the Spring Mountains and has been observed in 17 areas (Table 1). However, the number of occupied areas reported in past studies varies (12 occupied areas were reported in Boyd and Austin 1999, p. 20) based on how observations are spatially grouped. Four of these areas (Trough Spring, Kyle Canyon, Griffith Peak Trail/Harris Spring Road/Harris Mountain Road, and Potosi Mountain/Mt. Potosi/Boy Scout Camp) are referred to interchangeably as colonies or population sites (Boyd and Austin 1999, pp. 9, 20–21;

Boyd and Austin 2002, pp. 5, 13; Boyd 2004, pp. 2–3). Colonies are isolated populations (Scott 1986, p. 108) based on mate-locating behavior (Boyd and Austin 2002, p. 5; Boyd 2009, p. 1) of one or more males observed over a period of time, and they represent more than one incidental observation or sighting. Researchers define colonies of Spring Mountains *acastus* checkerspot butterflies based on the mate-locating behavior of males, also referred to as mate-locating sites (Boyd and Austin 2002, p. 5; Boyd 2009, p. 1). Currently, only four colonies are known to exist. The remaining 13 areas are referred to as incidental observations or sighting areas (Boyd and Austin 2001, p. 2; Boyd and Austin 2002, p. 3; Boyd 2004, p. 3), where intermittent observations of a few butterflies were recorded at a location. Observations at incidental sighting areas, and the potential for subsequent dispersal of individuals, may indicate the presence of additional unknown colonies (Boyd and Austin 1999, pp. 60–61; Boyd *et al.* 2000, p. 10). The areas where the Spring Mountains *acastus* checkerspot butterfly has been observed in a colony or sighting area represent the overall known population of the subspecies (Table 1).

Table 1. Areas where Spring Mountains *acastus* checkerspot butterfly observations have been documented. (Areas ordered from north to south.)

<i>Observation Area</i>	<i>First Year Observed</i>
Mt. Stirling	1983
Big Timber Spring	1995 or before
Wheeler Pass Road	1987
Trough Spring*	2001
McFarland Spring/Whisky Spring/Camp Bonanza	2003
Willow Spring/Willow Creek	1979
Clark Canyon	1994
Foxtail Canyon	1998
Deer Creek and picnic area	1965
Deer Creek Road (Telephone Canyon side)	1981 or 1987
Kyle Canyon – lower	1996 or before
Kyle Canyon – middle*	1950

Kyle Canyon – upper	1987
Griffith Peak Trail/Harris Spring Road/Harris Mountain Road*	1990
Coal Spring	1992
Switchback Spring	2003
Potosi Mountain/Mt. Potosi/Boy Scout Camp*	1995
<hr/>	
* colony	
Sources: Weiss <i>et al.</i> 1995, pp. 4, 19; Weiss <i>et al.</i> 1997, pp. 6–7, 47; Boyd and Austin 1999, pp. 19–21; Boyd 2004, pp. 2–3; Nevada Natural Heritage Program 2009	
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Status and Trends

Weiss *et al.* (1997, p. 2) indicated that butterfly populations are highly dynamic, and butterfly distributions can be highly variable from year to year. Butterflies may be restricted to moist and cool habitats during dry, warm periods, potentially expanding their distribution during periods marked by cooler and moister conditions (Weiss *et al.* 1997, pp. 2–3). Sagebrush checkerspot butterfly populations may undergo extreme fluctuations as a result of rainfall, parasitism, and other factors (Stout 2011, <http://www.raisingbutterflies.org>). Some subspecies, such as the Spring Mountains acastus checkerspot butterfly, may exist as a metapopulation (“local populations which interact via individuals moving among populations”) (Hanski and Gilpin 1991, p. 7) within the Spring Mountains (Weiss *et al.* 1997, p. 3). If this is the case, maintenance of dispersal corridors and unoccupied habitats is an important management consideration (Weiss *et al.* 1997, p. 3).

Determining the status of adults at a colony requires multiple visits during appropriate flight conditions and frequently enough to intercept a potentially short flight period. For example, in 1977, Austin and Austin (1980, p. 40) reported visits to the same

area of Kyle Canyon in which the Spring Mountains acastus checkerspot butterfly was observed on 2, 5, and 7 July, but not on 17 or 30 June and 15 July. Thus, this flight period may have been less than 2 weeks. In contrast, they reported that, in 1965, the flight period lasted over a 5-week period. While these observations may indicate a variable flight period, it is also possible that the perceived flight period may vary as a result of a dynamic interrelationship between search effort and abundance. In addition, assessments of population status and trends based on counts of particular life stages may be complicated by irregular life-history phenomena, such as an extended diapause (a period of dormancy, commonly induced by seasonal change in photoperiod (day length) or temperature) (Sands and New 2008, pp. 81–85). Unnecessary conservation concerns may arise as a result of irregular diapause that results in perceived changes in abundance (Sands and New 2008, pp. 81–85).

The largest known colony of Spring Mountains acastus checkerspot butterfly occurs at Griffith Peak Trail/Harris Spring Road/Harris Mountain Road. This was first documented as a sighting area in 1990, and later described as a potential colony in 1999 (Boyd and Austin 1999, p. 20). The Trough Spring colony was first identified in 2001 (Boyd and Austin 2002, p. 5). Boyd (2004, p. 3) stated that a single male observed at Willow Spring/Willow Creek in 2003 may have dispersed from Trough Spring or another unknown colony, because there had been no sightings in the area since the 1980s. The Spring Mountains acastus checkerspot butterfly was first documented at Potosi Mountain/Mt. Potosi/Boy Scout Camp in 1995 (Weiss *et al.* 1995, p. 6), and was described as a colony for the first time in 2000 (Boyd *et al.* 2000, p. 4).

DataSmiths (2007, p. 17) concluded that absence of adults at a site does not necessarily equate to ephemeral occupation or extirpation. Observations of the Spring Mountains acastus checkerspot butterfly illustrate this point. Boyd *et al.* (2000, p. 4) searched 17 areas (8 historical and 9 potential sites) for the Spring Mountains acastus checkerspot butterfly in 1999. During the 1999 surveys, Spring Mountains acastus checkerspot butterflies were observed at five of the eight historical sites (including Kyle Canyon (middle) Colony Site), with two of these described as potential new colonies (Griffith Peak Trail/Harris Spring Road/Harris Mountain Road and Potosi Mountain/Mt. Potosi/Boy Scout Camp). During 2003 surveys, the Spring Mountains acastus checkerspot butterfly was observed again in the Willow Spring/Willow Creek area (Boyd 2004, pp. 2–3) where it had not been seen during surveys in 1999 (Boyd and Austin 1999, Table 7, p. 98). Similarly, in 2003, the Spring Mountains acastus checkerspot butterfly was observed in the McFarland Spring/Whisky Spring/Camp Bonanza area (Boyd 2004, p. 2), even though it had not been observed there during previous surveys in 1998 (Boyd and Austin 1999, Table 12). These examples demonstrate that a lack of observations at a site does not necessarily mean that a site is extirpated because adult surveys will not detect diapausing larvae, and short adult flight periods coupled with low numbers may drastically reduce the likelihood of observing Spring Mountains acastus checkerspot butterflies.

Yearly population variation also is seen in the fluctuation in numbers of Spring Mountains acastus checkerspot butterflies observed during repeat surveys at the same

locations (Table 2). Surveys from 2000 and 2001 at the Griffith Peak Trail/Harris Spring Road/Harris Mountain Road site found that the highest total number of individuals observed on a single day increased from 19 to 104. In 2003, the highest number observed on a single day at the same site decreased to 27. In a 2006 interview with Bruce Boyd regarding observations that year, Boyd reported that the Spring Mountains acastus checkerspot butterfly had “done better” than other endemic species and had “good numbers” at Griffith Peak Trail/Harris Spring Road/Harris Mountain Road, as well as at Potosi Mountain/Mt. Potosi/Boy Scout Camp (Boyd 2006, pers. comm.). At locations where the butterfly was observed in 2006, Boyd stated that it appeared to be in “appropriate” numbers (Boyd 2006, pers. comm.). These observations support the conclusions of Weiss *et al.* (1997, p. 2) of highly dynamic butterfly populations where sightings may occur periodically throughout a species’ range, and populations at colony sites may fluctuate.

Table 2. Summary of monitoring results of Spring Mountains acastus checkerspot butterfly at three colony sites from 1998 through 2011 using standardized survey methods.

<i>Year</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2010</i>	<i>2011</i>
<u>Kyle Canyon (middle)</u>											
Highest # / day	4–10	5	6	8	6	7	4	1	4		1
# Visits	16	11	9	6	4	4	1	6	8		6
Peak date(s)	NR	6/19	6/15 & 6/30	6/18	6/24	6/10	6/21	6/13 & 6/21	6/24		6/13
<u>Griffith Peak Trail/Harris Spring Road/Harris Mountain Road</u>											
Highest # / day			19	104	50	27				2*	5
# Visits			9	5	5	4					3
Peak date			6/11	6/18	6/20	6/29					6/27 & 7/11
<u>Trough Spring</u>											
Highest # / day					20	41					1
# Visits					3	5					3
Peak date					6/18	6/1					6/10

Sources: (Boyd and Austin 1999, Table 8; Boyd 2004, p. 8; Jones and Stokes 2007a, p. 4; Jones and Stokes 2007b, p. 3; Kingsley 2008, p. 3, Service 2011a, pp. 1–3, Thompson *et al.* 2012, Table 2).

NR = not reported

* = did not use a standardized survey method

Surveys were conducted in 2010 and 2011 for adult Spring Mountains acastus checkerspot butterflies using both standardized and non-standardized methods. In 2010, at the Griffith Peak Trail/Harris Spring Road/Harris Mountain Road colony site, there were a total of four butterflies observed during the season (two by Pinyon 2011, p. 19; and two by Service 2011a, pp. 1–3), and the highest number of butterflies observed on a single day was two (Service 2011a, pp. 1–3). Numbers appeared to increase in 2011 at this colony site with a total of 86 reported observations (59 by Pinyon 2011, p. 19; 4 by Service 2011a, pp. 1–3; 23 by Thompson *et al.* 2012, Table 2), and the highest number of butterflies observed on a single day was 13 (Pinyon 2011, p. 19). The 13 individuals observed by Pinyon in 2011 were not observed using a standardized method similar to Pollard and Yates (1993 cited in Boyd and Austin 1999, p. 33) and described by Boyd and Austin (1999, p. 33), and are, therefore, not reported in Table 2. Results of the standardized surveys performed by Thompson *et al.* (2012, Table 2) at the other colony sites are shown in Table 2. Surveys for Spring Mountains acastus checkerspot butterfly were planned for 2012; however those data are not yet available.

Habitat

Sagebrush checkerspot butterfly habitat is described as dry washes in sagebrush-juniper woodland, oak or mixed conifer woodland, and streambeds (Opler 1999, p. 199). Elevations used by Spring Mountains acastus checkerspot butterfly coincide with the intergraded upper elevation of piñon-juniper (*Pinus monophylla*-*Juniperus osteosperma*) communities at 1,250–2,500 m (4,100–8,200 ft) and the lower elevation white fir-ponderosa pine (*Abies concolor*-*Pinus ponderosa* var. *scopulorum*) communities at 2,000–2,530 m (6,560–8,300 ft) (Niles and Leary

2007, pp. 5–6). Open vegetation communities associated with previous fire disturbances appear to be the preferred habitat (Boyd and Austin 2002, p. 5).

Biology

Adults

The flight season of the Spring Mountains acastus checkerspot butterfly is between mid-May and mid-July (Austin and Austin 1980 p. 40; Weiss *et al.* 1997, pp. 6, 37; Austin 1998, p. 576; Boyd 2004, pp. 1–2), peaking near the later part of June (Weiss *et al.* 1997, pp. 6, 37; Boyd and Austin 1999, p. 20; Boyd and Austin 2002, p. 4; Boyd 2004, p. 8). Distances moved during flight periods have not been documented, although Schrier *et al.* (1976, p. 285) observed that the closely related northern checkerspot butterfly could move as far as 1.6 km (1 mi). During the flight season, Spring Mountains acastus checkerspot butterfly adults have been observed nectaring on *Eriodictyon angustifolium* (yerba santa), *Heliomeris multiflora* var. *nevadensis* (= *Viguiera multiflora*; Nevada golden-eye), *Packera multilobata* (= *Senecio multilobatus*; lobeleaf groundsel), *Ceanothus* sp. (ceanothus), *C. greggii* (Mojave ceanothus), *Melilotus* sp. (clover), *Penstemon palmeri* (Palmer penstemon), and *Apocynum* sp. (dogbane) (Austin and Austin 1980, p. 40; Weiss *et al.* 1995, p. 9; Boyd *et al.* 2000, p. 6; Jones & Stokes 2007a, p. 4; Thompson *et al.* 2012, p. 22).

Spring Mountains acastus checkerspot butterfly males may seek females all day by perching and sometimes patrolling gulches (Scott 1986, p. 307; Kingsley 2008, pp. 7–8).

Washes and linear features are used primarily as mating sites during the flight season (Boyd and Austin 2001, p. 6; Boyd and Austin 2002, p. 5). Males may perch on several projecting objects in the same area, such as rocks or branches (Scott 1986, pp. 46–47, 307; Kingsley 2008, pp. 4, 7–8). At these sites, the males behave territorially. They remain in the same area and pursue any other butterflies or insects that come within a zone of a few square meters around the male, continuing this behavior towards the intruding animal until it leaves (Boyd and Austin 2001, p. 5; Boyd and Austin 2002, p. 5; Kingsley 2008, pp. 4, 7–8). During a brief flight season (Weiss *et al.* 1997, pp. 6, 37), females remain at the site long enough to find a male to mate with, and then leave the area to oviposit (Boyd and Austin 2001, p. 6; Boyd and Austin 2002, p. 5). Mating has been observed to last 40 minutes (Boyd 2004, p. 3). Sagebrush checkerspot butterflies have a high mating success, as indicated by a high percentage (>95) of females with spermatophores (a sac containing sperm) (Shields 1967, pp. 90, 123; Rhainds 2010, pp. 212–213). Approximately 10 days after mating, the female lays her eggs (Nunnallee 2011, p. 6).

Eggs

Clusters of sagebrush checkerspot butterfly eggs are laid on the underside of host leaves and sometimes on flower buds (Scott 1986, p. 307; Stout 2011, <http://www.raisingbutterflies.org>). Sagebrush checkerspot butterflies may lay 100 to 150 eggs in a cluster (Nunnallee 2011, p. 6). It may be advantageous for female butterflies to lay eggs in clusters to reduce exposure to predation or if host plants are rare or dispersed (Stamp 1980, p. 376). Eggs hatch after 6 days (Nunnallee 2011, p. 6), and the young larvae are gregarious on leaves or flowers (Scott 1986, p. 307; Nunnallee 2011, p. 6).

Larvae

Gregarious pre-diapause larvae of sagebrush checkerspot butterflies form silk webbing where they feed together on the larval host plant (Nunnallee 2011, p. 6; Opler *et al.* 2011, <http://www.butterfliesandmoths.org>; Stout 2011, <http://www.raisingbutterflies.org>). It is hypothesized that gregarious larvae may reduce rates of parasitism on the larvae because of collective defenses and may also facilitate feeding on larval host plants, particularly for early larvae, by enhancing the ability of larvae to overcome plant defenses (Chew and Robbins 1984, p. 75). *Chrysothamnus viscidiflorus* has been documented as a larval host plant (Boyd and Austin 2002, p. 2; Austin and Leary 2008, p. 99), is a widely distributed shrub in Western North America (Anderson 1986a, b as cited in McArthur and Stevens 2004, p. 531; Stubbendieck 2003, p. 248), and has a range that coincides with many of the ranges shown for sagebrush checkerspot butterflies (Opler 1999, p. 199; Opler *et al.* 2011, <http://www.butterfliesandmoths.org>).

Common names used interchangeably for subspecies of *C. viscidiflorus* have included Douglas rabbitbrush, chamisa, green rabbitbrush, low rabbitbrush, yellow rabbitbrush, viscid rabbitbrush, sticky-leaved rabbitbrush, downy rabbitbrush, and narrow-leaved rabbitbrush (Stubbendieck *et al.* 2003, p. 249; McArthur and Stevens 2004, p. 532; Niles and Leary 2007, p. 19). Three subspecies of *C. viscidiflorus* have been documented in the Spring Mountains, including *C. v. lanceolatus* (variously known as viscid rabbitbrush, sticky-leaved rabbitbrush, and yellow rabbitbrush), *C. v. puberulus* (downy rabbitbrush), and *C. v. viscidiflorus* (known as viscid rabbitbrush, sticky-leaved rabbitbrush, and narrow-leaved rabbitbrush) (Niles and Leary 2007, p.

19). A common name for *Chrysothamnus viscidiflorus viscidiflorus* has not been accepted (Young and Evans 1974, p. 469).

In the Spring Mountains, Niles and Leary (2007, p. 9) quantified the abundance of the various subspecies of *Chrysothamnus viscidiflorus* as rare, occasional, common, and abundant. *Chrysothamnus viscidiflorus* ssp. *lanceolatus* is occasional to common on slopes, ridges, and in washes (Niles and Leary 2007, p. 19). *Chrysothamnus viscidiflorus* ssp. *puberulus* (= var. *puberulus*) is occasional to rocky washes and on slopes (Niles and Leary 2007, p. 19). Of butterfly host plants described by Weiss *et al.* (1997, Figure 4), *Chrysothamnus viscidiflorus* is present in areas with low tree canopy cover (mean of 17 percent). *Chrysothamnus viscidiflorus* ssp. *viscidiflorus* (= var. *viscidiflorus*) is occasional to sandy-gravelly washes (Niles and Leary 2007, p. 19). *Chrysothamnus viscidiflorus* has many erect stems that are 1 to 3.5 ft (0.3 to 1.1 m) tall, growing from a base (McArthur and Stevens 2004, p. 531). In the Spring Mountains, *C. viscidiflorus* has been categorized as widespread, with a large population, and is considered very robust to human disturbance (Nachlinger and Reese 1996, pp. 66, 70). More recent information indicates that the larval host plant is widely distributed, but locally uncommon, within the Spring Mountains (D. Thompson 2012, pers. comm.). It is unknown whether or not habitat is a limiting factor for the subspecies.

It is unknown which of these subspecies of *Chrysothamnus viscidiflorus* are used as a larval host plant by the Spring Mountains acastus checkerspot butterfly; however, in maps prepared by Jones and Stokes (2007b, Figure 5a), Spring Mountains acastus checkerspot butterfly observations appeared to be more closely associated with *C. v.* ssp. *viscidiflorus* than *C.*

v. ssp. puberulus. Warren (2005, p. 232) reported that all sagebrush checkerspot butterfly subspecies in Oregon use *C. v. ssp. viscidiflorus* as a host plant, but that other subspecies of *C. viscidiflorus* may be used as well. *C. viscidiflorus* is the most commonly reported species of larval host plant for sagebrush checkerspot butterfly subspecies, but other plant species have been reported (Service 2011b, p. 4).

While not documented as a larval host plant for the Spring Mountains acastus checkerspot butterfly, *Machaeranthera canescens* occurs in similar habitats (Niles and Leary 2007, p. 20) used by the Spring Mountains acastus checkerspot butterfly. Locations with reported occurrences of *M. canescens* in the Kyle Canyon area (Jones and Stokes 2007b, Figure 13) are near Spring Mountains acastus checkerspot butterfly observation areas (Jones and Stokes 2007b, Figure 5a). Further study using appropriate methods (Shields *et al.* 1969, p. 24) will be required to determine if Spring Mountains acastus checkerspot butterfly uses other larval host plants.

Ericameria nauseosa (= *Chrysothamnus nauseosus*; rubber rabbitbrush) also has been suspected of being a larval host plant of the Spring Mountains acastus checkerspot butterfly (Weiss *et al.* 1997, p. 6). Boyd and Austin (1999, pp. 20–21) unsuccessfully attempted to feed *E. nauseosa* to Spring Mountains acastus checkerspot butterfly larvae, and reported that their results were inconclusive. Early inferences that *E. nauseosa* may be the larval host plant for the Spring Mountains acastus checkerspot butterfly may be attributed to early uncertainty about its taxonomy and its close resemblance to the northern checkerspot butterfly, which has been documented to use *E. nauseosa* and *C. viscidiflorus* as larval host plants (Scott 1986, p. 306;

Austin and Leary 2008, p. 102), and the interchangeable use of the generic common name rabbitbrush when referring to rubber or green rabbitbrush. The best available scientific and commercial information does not indicate there is any use of *E. nauseosa* by sagebrush checkerspot butterflies (Service 2011b, p. 4).

After feeding on the larval host plant during favorable conditions, larvae enter diapause, which allows them to survive through the winter, and which is likely a result of decreasing temperature and photoperiod (Scott 1979, p. 172). Spring Mountains acastus checkerspot butterfly larvae diapause under rocks as half-grown larvae during the winter (Scott 1979, pp. 172, 191; Scott 1986, pp. 27, 307; Opler *et al.* 2011, <http://www.butterfliesandmoths.org>). During times of unfavorable weather, sagebrush checkerspot butterflies may diapause for many months or years (Scott 1986, p. 307; Opler *et al.* 2011, <http://www.butterfliesandmoths.org>).

After winter, post-diapause larvae of other subspecies have been reported to be solitary (Nunnallee 2011, p. 6); however, Spring Mountains acastus checkerspot butterfly larvae of different instars (larval stages of growth between molts of the exoskeleton (Scott 1986, p. 21)) have been observed together in the Spring Mountains (Boyd 2004, p. 3). When disturbed, larvae will release and fall to the understory, where they roll into tight balls and are difficult to find (Wolfe 2004, p. 13). Stamp (1984, p. 6) hypothesized that thrashing by checkerspot butterflies after disturbance may be an adaptation to prevent parasitization by wasps or flies. There are no known reports of parasites or disease in populations of Spring Mountains acastus checkerspot butterflies, likely because of limited numbers and past research emphasis on adults, and because it is difficult to detect parasites or disease in checkerspot and other butterflies. Parasites

documented to infect Neumoegen's checkerspot butterfly include the *Siphosturmia confusa* fly (Stireman and Singer 2003, p. 630) and braconid wasp *Cotesia* (= *Apanteles*) *koebelei* (Krombein *et al.* 1979, p. 249). It has been reported that for the subspecies *acastus* checkerspot butterfly, populations fluctuate as a result of parasitism (Stout 2011, <http://www.raisingbutterflies.org>). In fact, larval mortality in many species of butterflies occurs as a result of predation (including parasitism) and starvation (Haukioja 1993, as cited in Kuussaari *et al.* 2004, p. 148).

When enough suitable food is present, and after reaching an adequate size, larvae find a pupation site where they attach themselves to a silk mat (Scott 1986, p. 13) on a leaf or twig (Stout 2011, <http://www.raisingbutterflies.org>). In 2002, one of four larvae removed from the population at the Griffith Peak Trail colony site successfully pupated in 11 days (Boyd 2004, p. 3), while other subspecies are reported to pupate in 18 days (Nunnallee 2011, p. 6). After pupation, adult butterflies emerge to feed and seek mates.

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

In making this finding, information pertaining to the Spring Mountains acastus checkerspot butterfly in relation to the five factors provided in section 4(a)(1) of the Act is discussed below. In considering what factors might constitute threats to a species, we must look beyond the exposure of the species to a particular factor to evaluate whether the species may respond to that factor in a way that causes actual impacts to the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat and, during the status review, we attempt to determine how significant a threat it is. The threat is significant if it drives, or contributes to, the risk of extinction of the species such that the species warrants listing as endangered or threatened as those terms are defined in the Act. However, the identification of factors that could impact a species negatively may not be sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that these factors are operative threats that act on the species to the point that the species may meet the definition of an endangered or threatened species under the Act.

In making our 12-month finding on the petition we considered and evaluated the best available scientific and commercial information.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

All Sites

Fire Suppression

The Spring Mountains acastus checkerspot butterfly may be negatively affected by fire suppression as inferred by its proximity to areas with fire disturbance (Boyd and Austin 2002, p. 5; Boyd 2004, p. 3–4). It has been speculated that effects to the Spring Mountains acastus checkerspot butterfly may occur as a result of inhibited dispersal (Boyd 2004, p. 3–4). One mechanism for the inhibited dispersal could be a decrease in larval host plants across the landscape caused by fire suppression. *Chrysothamnus viscidiflorus* increases vigorously and rapidly at disturbed sites (Nachlinger and Reese 1996, p. 32; McArthur and Stevens 2004, p. 532). After a disturbance, such as a fire, *C. viscidiflorus* may dominate the habitat for a long period of time (Young and Evans 1974, p. 469).

Fire suppression in the Spring Mountains has resulted in long-term successional changes, including increased forest area and forest structure (higher canopy cover, more young trees, and more trees that are intolerant of fire) (Nachlinger and Reese 1996, p. 37; Amell 2006, pp. 6–9; Boyd and Murphy 2008, pp. 22–28; Denton *et al.* 2008, p. 21, Abella *et al.* 2011, pp.10, 12). Overall, we have limited information about how the frequency, size, or severity of fire has

changed through time. However, the available evidence does not suggest that fire suppression has reduced the amount of habitat for the species, is likely to do so in the future, or that habitat is a limiting factor for the Spring Mountains acastus checkerspot butterfly. Therefore, based on the currently available information fire suppression is not currently a threat to the subspecies, nor does it indicate that it is likely to become so in the future.

Our review of the best available information indicates that habitat modification or destruction associated with fire suppression is not a threat to the subspecies, nor does the available information indicate that it is likely to become so in the future. In addition, we discuss the habitat threats at individual colony sites below.

Griffith Peak Trail/Harris Spring Road/Harris Mountain Road Colony Site

Aside from the limited information about the effects of fire suppression on the Spring Mountains acastus checkerspot butterfly rangewide, there is no information available to indicate that habitat modification or destruction is a threat to the Griffith Peak Trail/Harris Spring Road/Harris Mountain Road colony, nor does the available information indicate that it is likely to become so in the future.

Kyle Canyon (middle) Colony Site

Highway Modifications and Power Line Maintenance

Highway modifications and power line maintenance activities may have affected the Spring Mountains acastus checkerspot butterfly in areas near the Kyle Canyon (middle) colony site. Highway modifications and power line maintenance (grading, sod dumping, large vehicle occurrence (as indicated by tracks), and clearing) were observed in 1998 in the Kyle Canyon area (Boyd and Austin 1999, p. 59), and in 2006, historical grading, repairing and roadway replacement, and illegal dumping also were observed near the Kyle Canyon (middle) colony site (Jones and Stokes 2007a, Appendix B). However, these reports do not provide information or references that characterize the scope, immediacy, and intensity of any of these potential stressors (processes or events with negative impacts). While the reports indicate that these activities took place in the same area where Spring Mountains acastus checkerspot butterfly occurs, there is no available information indicating the level of exposure, such as whether larval and nectar plants were impacted. The site was inventoried 16 times in 1998, and, based on the descriptions provided in the report (Boyd and Austin 1999, p. 10) and the absence of any further disturbance documented in subsequent surveys (11 visits in 1999, 9 visits in 2000, 7 visits in 2001, 6 in 2002, and 5 in 2003) (Boyd *et al.* 2000, pp. 1–36; Boyd and Austin 2001, pp. 1–38; Boyd and Austin 2002, pp. 1–30; Boyd 2004, pp. 1–11), it appears that these activities may be localized and infrequent. In addition, an increase in the number of individuals observed from 1999 to 2001 at the Kyle Canyon (middle) colony site (Table 2) after the highway modifications and power line maintenance suggests that these activities did not cause sufficient impacts to cause a decline at this colony site. No information is available regarding highway modifications and power line maintenance at the Kyle Canyon (middle) Colony Site after 2006.

Highway modifications and power line maintenance activities have occurred historically in localized areas. Although we are not aware of any further highway modification projects, we understand that maintenance activities can take place in the future, know of no planned specific action. The information suggests that currently the intensity of this stressor is low and the exposure to the Spring Mountains acastus checkerspot butterfly is insignificant because these activities occur infrequently in small areas within the butterfly's range. Therefore, we have determined that highway modifications and power line maintenance are not threats to the Spring Mountains acastus checkerspot butterfly now, nor does the available information indicate that they are likely to become so in the future.

Fuel Treatments

Fuel reduction projects may affect the Spring Mountains acastus checkerspot butterfly negatively or beneficially. The effects of fuel reduction treatments on butterflies depend upon the timing (Pilliod *et al.* 2006, p. 23). Fuel reduction projects could affect the Spring Mountains acastus checkerspot butterfly negatively by reducing the quantity or quality of habitat and affecting survival or fecundity. On the other hand, fuel reduction projects could beneficially affect the Spring Mountains acastus checkerspot butterfly by creating conditions that favor nectar and larval host plants (Weiss *et al.* 1997, p. 27). As mentioned above, *Chrysothamnus viscidiflorus* increases vigorously and rapidly at disturbed sites (McArthur and Stevens 2004, p. 532) and may dominate the habitat for a long period of time following disturbance (Young and Evans 1974, p. 469).

The U.S. Forest Service implemented the Spring Mountains Hazardous Fuels Reduction Project in the Spring Mountains between 2008 and 2011 (Lillis 2010). It was designed to reduce the volume and cover of woody vegetation to lower the wildfire risk to life and property in the SMNRA wildland-urban interface (Forest Service 2007a, pp. 1–18; Forest Service 2007b, pp. 1–57). Design criteria were developed to reduce or avoid potential resource conflicts, including those associated with the Spring Mountains acastus checkerspot butterfly (Forest Service 2007a, p. 4).

In areas where the Spring Mountains Hazardous Fuels Reduction Project coincides with the Spring Mountains acastus checkerspot butterfly, the likelihood of direct mortality to the butterfly or impacts to its habitat were minimized by implementing the design criteria in the project's environmental assessment (Forest Service 2007b, Appendix B, Design Criteria B1, B6, W5, W6, W7, W11, M1). The design criteria provided for surveys of butterflies and habitat, habitat mapping, restrictions on host plant removal in core colonies, avoidance of host plants, minimization of disturbance by using manual methods, weed prevention, education of implementation crews, monitoring during implementation, and post-project monitoring of butterflies and their habitat. The scope or geographic extent of the Spring Mountains Hazardous Fuels Reduction Project is localized because it occurs along the wildland-urban interface in one colony site area, Kyle Canyon (middle). The project's initial entry has already occurred, but re-treating of shrubs may occur every 5 to 10 years after the initial treatment (Forest Service 2007a, p. 3).

The level of exposure to the Spring Mountains acastus checkerspot butterfly's eggs and larvae from the Spring Mountains Hazardous Fuels Reduction Project is low to insignificant because of the project design criteria and the short time required for eggs to hatch. Exposure of active larvae to impacts from fuel reduction projects would be small to insignificant when design criteria are planned and implemented, such as avoiding larval host plants and ensuring that the method (for example, manual versus mechanical) and timing (periods of larval inactivity) of treatment result in larvae having a lower likelihood of exposure. Impacts to Spring Mountains acastus checkerspot butterfly pupae are likely insignificant because they affix to the underside of leaves for a short period in this stage, and are provided some protection by their larval host plant. Finally, Spring Mountains acastus checkerspot butterfly adults are mobile and may escape threats from fuels reduction projects. Effects on breeding adult Spring Mountains acastus checkerspot butterflies are likely insignificant because a short time is required for successful copulation and the duration of fuel treatment activities is likely brief. The Forest Service avoids treatment of vegetation along dry washes (Forest Service 2007a, W8), which also reduces the likelihood of exposure and impacts to breeding Spring Mountains acastus checkerspot butterflies.

Although the Spring Mountains Hazardous Fuels Reduction Project may result in short-term negative impacts to the Spring Mountains acastus checkerspot butterfly, the best available information does not indicate that this project has affected the Spring Mountains acastus checkerspot butterfly negatively at the population level now, nor is it likely to in the future.

Middle Kyle Complex Project

The Forest Service purchased a golf course property in 2004 that will be used for the Middle Kyle Complex Project (Forest Service 2009, pp. 2–4). The project includes construction of a visitor center and associated trail, and design criteria are in place to prevent and minimize impacts to the Spring Mountains acastus checkerspot butterfly (Forest Service 2009, pp. 4–5). This design includes criteria and measures that will avoid and minimize temporary construction disturbance to known Spring Mountains acastus checkerspot butterfly breeding areas. The design criteria include the following: Prohibit construction of Kyle Canyon Wash Trail and bury utilities from early May to mid-July (to avoid the butterfly’s flight season); erect temporary construction fencing along the proposed construction limits prior to any ground-disturbing activities; contain all activities within the approved construction limits; maintain temporary fencing until notified by the contracting officer; collect native seed from appropriate larval host and nectar plants; revegetate temporary disturbance areas following completion of construction; implement construction dust control measures to minimize impacts to blooming nectar plant populations; reduce off-trail use in documented Spring Mountains acastus checkerspot butterfly breeding and mate selection areas; and construct a fence or barrier adjacent to the newly constructed trail in Kyle Canyon Wash. When the project is implemented, in 2012 or later, the design criteria and measures should result in minimizing impacts to the Spring Mountains acastus checkerspot butterfly and its habitat in Kyle Canyon Wash. Any negative impacts from the project are anticipated to be minor and have negligible impacts to the overall population of the subspecies and habitat at this site.

The Middle Kyle Complex Project will occur in a localized area, and, because of the design criteria, including avoidance of larval host plants, the project will result in low response,

low intensity, and ultimately insignificant exposure of Spring Mountains acastus checkerspot butterflies to impacts. Therefore, we have determined that the Middle Kyle Complex Project is not a threat to the Spring Mountains acastus checkerspot butterfly now, nor does the available information indicate that it is likely to become one in the future.

Potosi Mountain/Mt. Potosi/Boy Scout Camp Colony Site

Fuel Treatments

The Potosi Mountain/Mt. Potosi/Boy Scout Camp colony site is located at the Boy Scouts of America Kimball Scout Reservation, north of Potosi Mountain. A fuels reduction project, funded through a grant from the Nevada Division of Forestry, was implemented in April 2007 (Otero 2007, p. 6). The 2007 fuels reduction project resulted in cut wood waste stacked more than a meter high along and on both sides of the dirt road at this site, and it was asserted that the cut waste effectively blocked all male perching and mate-locating sites in June that year (Boyd 2009, p. 3). We interpret the term “blocked” to mean obstruction of male perching and mate-locating sites as a result of these areas being covered by debris. The best available information does not indicate that the larval host plant for the Spring Mountains acastus checkerspot butterfly occurred abundantly near the road at this colony site. *Chrysothamnus viscidiflorus* was not observed in this area after searching the sides of the canyon (Thompson *et al.* 2012, p. 24) where Spring Mountains acastus checkerspot butterflies have been historically observed (Weiss *et al.* 1997, p. 6). However, Spring Mountains acastus checkerspot butterflies may be using adjacent

areas that contain the larval host plant and areas near the road for mate locating. Our analysis addresses the alleged impact caused by blocking male perching and mate-locating sites.

The best available information does not indicate if, or to what extent, the alleged blocking of male perching sites had occurred at this site. The Potosi Mountain/Mt. Potosi/Boy Scout Camp colony site was visited two times in 2011, and waste piles were no longer present (Service 2011a, pp. 1–3). However, wood chips were present near the road and camping areas, but had mostly decomposed, with some patches remaining (Service 2011a, pp. 1–3). Fuel reduction projects likely will reoccur in the future as part of wildland-urban interface projects to prevent damage to life or property from wildfire; however, the available information does not indicate that fuel reduction is impacting the subspecies such that it is currently affected at the population level, nor does it indicate that it is likely to in the future.

The best available information indicates that the fuels reduction project at the Boy Scouts of America Kimball Scout Reservation, north of Potosi Mountain, occurred in April before breeding activity occurred, and, thus, breeding adults likely were not disturbed. Although the number of sites available for perching by males may be reduced temporarily if cut waste is piled for later treatment (commonly chipping or burning), other sites along the road and in the canyon would be available within this site. The Spring Mountains *acastus* checkerspot butterfly has been observed using multiple perch sites during mate-locating (Kingsley 2008, pp. 4, 7–8). Because breeding occurs during a brief time period, the butterflies use multiple perch sites, and they likely exhibit a high breeding success rate (Shields 1967, p. 123; Rhainds 2010, pp. 212–

213), impacts to the Spring Mountains acastus butterfly from the fuels reduction project at Potosi Mountain/Mt. Potosi/Boy Scout Camp colony site were likely minimal and insignificant.

The fuels reduction project at the Potosi Mountain/Mt. Potosi/Boy Scout Camp colony site is localized and will likely occur again in the future because maintenance will be required and fires are being suppressed. The intensity and exposure of the impact from stacking cut waste to the Spring Mountains acastus checkerspot butterfly is low and insignificant because the best available information indicates that Spring Mountains acastus checkerspot butterflies are able to use more than one perching site and that they can successfully breed in only a short period of time. We have determined that the stacking of cut waste at the Potosi Mountain/Mt. Potosi/Boy Scout Camp colony site is not a threat to the Spring Mountains acastus checkerspot butterfly now, nor does the available information indicate that it is likely to become a threat in the future.

Trough Spring Colony Site

Off-highway Vehicles

Information in our files indicates that off-highway vehicles have been present at the Trough Spring colony site (Service 2011a, pp. 1–3). Off-highway vehicles could adversely affect the Spring Mountains acastus checkerspot butterfly by reducing the quantity or quality of habitat, reducing survival or fecundity, or directly impacting individuals. Off-highway vehicles were observed on the road that goes to Trough Spring during the 2011 field season, but no off-highway vehicles or signs of vehicle use were observed in Spring Mountains acastus checkerspot

butterfly habitat with its larval host plant present (Service 2011a, pp. 1–3). Any vehicle access from the end of the road to Trough Spring and Spring Mountains acastus checkerspot butterfly habitat is inhibited by tree downfall and dense shrubs resulting from a wildfire (Service 2011a, pp. 1–3). In addition, the Trough Spring colony site is partially within the Mt. Charleston Wilderness, where motor vehicle use is prohibited.

The best available information suggests that the Spring Mountains acastus checkerspot butterfly is not being affected by off-highway vehicles. Although off-highway vehicles will likely continue to use the road that goes to Trough Spring in the future, the best available information indicates that off-highway vehicles have impacted the habitat and the Spring Mountains acastus checkerspot butterfly. However, the exposure of the Spring Mountains acastus checkerspot butterfly to impacts from off-highway vehicles is insignificant because of obstructions described above between the designated road and the Trough Spring colony site area. We have determined that off-highway vehicle use does not pose a threat to the Spring Mountains acastus checkerspot butterfly at the Trough Spring colony site now, nor does the available information indicate that it is likely to become one in the future.

Horses and Elk

Horses (*Equus ferus*) and elk (*Cervus elaphus*) utilize the Trough Spring area (Service 2011a, pp. 1–3; Thompson *et al.* 2012, p. 22). Horses and elk could affect Spring Mountains acastus checkerspot butterflies by trampling them when moving through or by feeding in areas occupied by all life stages. While horses or elk could cause direct mortality, the likelihood of

this occurring is probably low because: (1) Horses feed predominantly on forbs or grasses (National Research Council 1982, pp. 26, 31); (2) elk that may be more likely to feed on *Chrysothamnus viscidiflorus* are more likely to do so in the winter (Stubbendieck *et al.* 2003, p. 249), when larvae are in diapause below rocks (Scott 1979, pp. 172, 191; Scott 1986, pp. 27, 307; Opler *et al.* 2011, <http://www.butterfliesandmoths.org>); (3) eggs or pupae are exposed for only a brief period of time in late spring or early summer (1 to 3 weeks) (Nunnallee 2011, p. 6; Boyd 2004, p. 3); and (4) if larvae are disturbed, they may fall (Wolfe 2004, p. 13) to the ground beneath the plant where trampling and feeding may be inhibited by thicker shrub branches.

Overall, the quantity or quality of larval or nectar plant habitat for the Spring Mountains acastus checkerspot butterfly may be affected by ungulate browsing. Food for Spring Mountains acastus checkerspot butterfly larvae may increase under certain browsing regimes. In experimental tests on the effects of clipping *Chrysothamnus viscidiflorus*, herbage production was increased when the plants were partially defoliated (Willard and McKell 1978, p. 515). Moderate and heavy clipping intensities resulted in reduced herbage production compared to unclipped *C. viscidiflorus* shrubs. Based upon these results, light defoliation may result in greater herbage production than moderate, heavy, and no defoliation. Wild and domestic animals do not prefer most subspecies of *C. viscidiflorus* (Young and Evans 1974, p. 469). While horses are considered grazers, they have been observed to feed on *C. viscidiflorus* in the summer (Smith *et al.*, as cited in National Research Council 1982, p. 31). During visits to the site in 2011, browsing at the Trough Spring colony site appeared to be heavy (Service 2011a, pp. 1–3). Grazing of grasses or forbs can decrease competition for *C. viscidiflorus*. Subspecies of *C. viscidiflorus* have been observed to vary in palatability to ungulates (McArthur and Stevens

2004, p. 532). In the late fall and winter, after more desirable forage has been consumed, *C. viscidiflorus* may be an important source of food for game and livestock (McArthur and Stevens 2004, p. 532).

Grazing and browsing by horses and elk are localized at the Trough Spring colony site, and these activities are expected to continue into the future. Because *Chrysothamnus viscidiflorus* plants are not removed and Spring Mountains acastus checkerspot butterfly larvae are able to evade browsing animals by falling to the ground when disturbed (Wolfe 2004, p. 13), the impact of grazing and browsing is likely low. If grazing and browsing intensity is moderate to high, however, this may result in direct mortality of individuals or a reduction in available host plants. The available information does not indicate that browsing is negatively impacting the Spring Mountains acastus butterfly at the population level; therefore, the best available scientific and commercial information does not indicate that ungulates are currently a threat to the subspecies, nor are they likely to become so in the future.

All Sites

Conservation Efforts to Reduce Habitat Destruction, Modification, or Curtailment of Its Range

The Spring Mountains acastus checkerspot butterfly is listed in the SMNRA Conservation Agreement (Forest Service *et al.* 1998, p. 32) and is considered under a 2004 voluntary memorandum of agreement (MOA) between the Forest Service and the Service (Forest Service and Fish and Wildlife Service 2004, p. 1). The MOA was designed to establish a general

framework for a streamlined process for interagency cooperation between the Humboldt-Toiyabe National Forest and the Service (Forest Service and Fish and Wildlife Service 2004, p. 1). The conservation agreement was in effect from April 13, 1998, to 2008 (Forest Service *et al.* 1998, pp. 44, 49), when it was renewed (Forest Service 2008). The conservation agreement is still being implemented. A new conservation agreement is currently being developed for the SMNRA. The conservation agreement, MOA, and Clark County Multiple Species Habitat Conservation Plan (MSHCP) guide and assist agency planning for Spring Mountains acastus checkerspot butterfly habitat and population monitoring. The conservation agreement and MOA facilitate protection-oriented resource management that considers conservation values through early project planning, as well as species, habitat, and ecosystem inventory, protection, monitoring, restoration, research, and education (Forest Service *et al.* 1998, p. 1), which may help alleviate negative impacts to the butterfly. Voluntary conservation actions from the conservation agreement (Forest Service *et al.* 1998, pp. 1–50) are also found in the MSHCP (RECON 2000c pp. A-79–A-88).

Summary of Factor A

We do not find highway modification and power line maintenance, hazardous fuels reduction projects, equestrian traffic, off-highway vehicle use, and browsing by horses or elk to be threats to the Spring Mountains acastus checkerspot butterfly. Although fire suppression has been suggested to negatively impact Spring Mountains acastus checkerspot butterfly habitat, the available information does not suggest that changes to fire frequency or changes in habitat quality or quantity such that fire suppression is a currently a threat to the subspecies or likely to

become one in the future. In addition, the available information does not indicate that habitat is a limiting factor for the Spring Mountains acastus checkerspot butterfly now or likely to become so in the future. Based upon our review of the best available scientific and commercial information, we find that the present or threatened destruction, modification, or curtailment of its habitat or range is not a threat to the Spring Mountains acastus checkerspot butterfly, nor is it likely to become so in the future.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

In areas surrounding the range of the Spring Mountains acastus checkerspot butterfly, sagebrush checkerspot butterflies have been confiscated from illegal commercial traders (U.S. Attorney's Office 1994, pp. 23, 47; Alexander 1996, pp. 1–6). One sagebrush checkerspot was removed from the Grand Canyon National Park in 1985, and 14 were removed from Death Valley National Park in 1987 (U.S. Attorney's Office 1994, pp. 23 and 47), but it is unknown whether any sagebrush checkerspot butterflies have been collected for unauthorized commercial use in the Spring Mountains. The Spring Mountains are located between Grand Canyon National Park to the east (approximately 300 km (180 mi)) and Death Valley National Park to the west (approximately 130 km (80 mi)). There is no available information regarding the utilization of Spring Mountains acastus checkerspot butterflies for unauthorized commercial purposes.

Spring Mountains acastus checkerspot butterflies have been collected for authorized commercial use, including for scientific and educational purposes. We infer that the earliest

collections of Spring Mountains acastus checkerspot butterflies are from the 1920s, based on Boyd and Austin (1999, p.19). Most documented collections of Spring Mountains acastus checkerspot butterfly have occurred for scientific or educational purposes (Table 3). On Forest Service-administered lands, a special use permit is required for the commercial collection of butterflies (36 CFR 251.50), which would include collections for research, museums, universities, or professional societies (Forest Service 2003, pp. 2–3).

Table 3. Numbers of Spring Mountains acastus checkerspot butterfly specimens collected by area, year, and sex found in published documents.				
Collection Area/ Year	Male	Female	Unknown	Total
Deer Cr. Rd.				
1950			1	1
1965	1			1
1977	6	2		8
1981		3		3
Deer Cr. Rd. Total	7	5	1	13
Spring Mountains (general reference)				
1934	10	1		11

2002			2	2
Harris Spring Rd. / Harris Mountain Rd				
1990	16	6		22
1999	2	2		4
Griffith Peak Trail				
2002			4 ^L	4
Kyle Canyon				
1950			2	2
1965	2		62	64
1974	1	2		3
1977	15	2		17
1978	6	1		7
1979	41	3		44
1981	8	1		9
1987	17	5		22
1988	5			5
1989	28	5		33
1990	13	2		15
2006			2	2
Kyle Canyon Total	136	21	66	223
Willow-Cold Creek				

1979	1			1
Area Totals	172	35	73	
Total				280
References: Austin and Austin 1980, p. 40; Austin 1998, p. 576; Boyd 2004, p. 3; Boyd <i>et al.</i> 2000, p. 7; Jones and Stokes 2007a, Service 2012, pp. 1–4, and YPM ENT Catalog (http://peabody.yale.edu/collections/search-collections?ent) Note: duplicate specimens from Austin and Austin 1980 and Austin 1998 have been accounted for. ^L = larvae				

Prior to 2006, collecting for noncommercial (recreational and personal) purposes did not require a collecting permit issued by the Regional Forester in most areas (Forest Service 1998, p. 1; Joslin 1998, p. 74). Since 1996 within the SMNRA, Lee Canyon, Cold Creek, Willow Creek, and upper Kyle Canyon have been identified as areas where permits are required for any butterfly collecting (Forest Service 1996, pp. 28, E9). There are no records indicating that special use permits have been issued for commercial or noncommercial collecting of Spring Mountains acastus checkerspot butterflies in the Spring Mountains (S. Hinman 2011, pers. comm.). However, there are published and unpublished documented accounts of collections from the Spring Mountains (Austin and Austin 1980, p. 40; Austin 1998, p. 576; Boyd 2004, p. 3; Jones and Stokes 2007a, Table 5; Service 2012, pp. 1–4; YPM ENT Catalog, <http://peabody.yale.edu/collections/search-collections?ent>) (see Table 3 for references).

The best available information indicates that Spring Mountains acastus checkerspot butterflies have been collected for personal use (Service 2012, pp. 1–4). In some cases, private collectors have more extensive collections of particular species than museums (Alexander 1996, p. 2). Published and unpublished accounts of Spring Mountains acastus checkerspot butterfly specimens in collections vary, with typically more males collected than females during any year (Table 3). Documented specimens indicate that most collections are from the Kyle Canyon area. A survey of butterfly collectors in The Lepidopterists' Society in the Northwest showed that approximately one-third of the respondents indicated that they collected for personal collections, another third collected for research or museum collections, and the remainder fell within categories that may count for either (Mazzei and Shapiro 2001, p. 103).

The collection of butterflies in general results in the direct mortality of individuals and, when a population is small, may affect the population's ability to recover. Butterfly collecting is generally thought to have less of an impact on butterfly populations compared to other threats; however, populations already stressed by other factors may be threatened by intensive collecting (Thomas 1984, p. 345; Miller 1994, pp. 76, 83; New *et al.* 1995, p. 62). Thomas 1984 (p. 345) suggested that closed, sedentary populations of fewer than 250 adults are most likely to be at risk from overcollection. While there is little documentation of the extirpation of any butterfly species as a result of overcollecting (Miller 1994, p. 76), it has been shown that removing a large number of female specimens from a population may result in a greater threat of population decline (Hayes 1981, p. 197) and potentially hasten the extinction of a species (Thomas 1984, p. 341).

The reported observed or captured sex ratio (males:females) in Spring Mountains acastus checkerspot butterflies is strongly biased (170:33) towards males (Table 3). Although many factors can affect the differences between the observed and actual sex ratios, which vary between years (Ehrlich *et al.* 1984, pp. 527–539; Boggs and Nieminen 2004, pp. 92–94), the magnitude of this difference suggests that this bias is real, and that there are typically fewer females than males in Spring Mountains acastus checkerspot butterfly populations. Because males and females are similar in appearance, it may be difficult for most collectors to selectively capture either sex.

There is no available information regarding the utilization of Spring Mountains acastus checkerspot butterflies for commercial purposes (other than for scientific and educational purposes) in the past, or information to indicate a historic, current, or future demand. The Spring Mountains acastus checkerspot butterfly has been collected historically for recreational, scientific, and educational purposes. Published accounts of collections for management or scientific purposes indicate that collecting Spring Mountains acastus checkerspot butterflies has become less frequent in the last couple of decades (Table 3).

Summary of Factor B

Survey data indicate abundances may be low, but we do not know actual population numbers of the Spring Mountains acastus checkerspot butterfly. Therefore, the percentage of the population of Spring Mountains acastus checkerspot butterfly that has been removed through collecting is unknown. However, the number of reported Spring Mountains acastus checkerspot

butterflies collected has declined in recent decades, and the available information does not indicate that collection has had an adverse effect on the species, or nor is it likely to have an adverse effect in the future. Nonetheless, because collection is known to occur, we will work with the Forest Service to enhance the effectiveness of their permitting program and continue to monitor abundance and collection efforts. Based upon our review of the best available scientific and commercial information, we find that overutilization for commercial, recreational, scientific or educational purposes is not a threat to the Spring Mountains acastus checkerspot butterfly now, nor is it likely to become so in the future.

Factor C. Disease or Predation

There is no available information regarding any impacts from either disease or predation on the Spring Mountains acastus checkerspot butterfly. Therefore, based on the best available scientific and commercial information, we do not find disease or predation to be threats to the Spring Mountains acastus checkerspot butterfly now, nor are they likely to become so in the future.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Existing regulatory mechanisms or other agreements that could provide some protection for the Spring Mountains acastus checkerspot butterfly include: (1) Local land use laws, processes, and ordinances; (2) State laws and regulations; and (3) Federal laws and regulations. Actions adopted by local groups, States, or Federal entities that are discretionary, including

conservation strategies and guidance, are not regulatory mechanisms; however, we will discuss and evaluate them below. The Spring Mountains acastus checkerspot butterfly primarily occurs on Federal land under the jurisdiction of the Forest Service; therefore, our discussion will primarily focus on Federal laws.

Local Laws and Ordinances

There is no available information regarding local land use laws and ordinances that have been issued by Clark County or other local government entities for protection of the Spring Mountains acastus checkerspot butterfly.

State Law

Nevada Revised Statute sections 503 and 527 offer protective measures to wildlife and plants, but do not include invertebrate species such as the Spring Mountains acastus checkerspot butterfly. Therefore, no regulatory protection is offered under Nevada State law.

Federal Law

Spring Mountains acastus checkerspot butterflies have been detected consistently in four known colony sites in recent years. Three of the colony sites, Griffith Peak Trail/Harris Spring Road/Harris Mountain Road, Kyle Canyon (middle), and Trough Spring, are located mainly on Federal land. Large portions of the Griffith Peak Trail and Trough Spring colony sites are

located within the Mt. Charleston Wilderness. The Forest Service manages lands designated as wilderness under the Wilderness Act of 1964 (16 U.S.C. 1131–1136). Within these areas, the Wilderness Act states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircraft; (4) there can be no other form of mechanical transport; and (5) no structure or installation may be built. As such, the majority of Spring Mountains acastus checkerspot butterfly habitat in the Griffith Peak Trail and Trough Springs area is protected from direct loss and degradation by the prohibitions of the Wilderness Act. Spring Mountains acastus checkerspot butterfly habitat at Kyle Canyon, Potosi Mountain, along the Harris Spring and Harris Mountains Road, and elsewhere is located outside of the Mt. Charleston Wilderness, and, thus, it is not subject to protections afforded by the Wilderness Act.

The National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. 4321 *et seq.*), requires Federal agencies, such as the Forest Service, to describe proposed agency actions, consider alternatives, identify and disclose potential environmental impacts of each alternative, and involve the public in the decision-making process. Federal agencies are not required to select the NEPA alternative having the least significant environmental impacts. A Federal agency may select an action that will adversely affect sensitive species, provided that these effects are identified in a NEPA document. NEPA itself is a disclosure law, and does not require subsequent minimization or mitigation of actions taken by Federal agencies. Although Federal agencies may include conservation measures for the Spring Mountains acastus checkerspot butterfly as a result of the NEPA process, such measures are not required by the statute. The Forest Service is required to analyze its projects in accordance with NEPA.

The SMNRA is 1 of 10 districts of the Humboldt-Toiyabe National Forest. Public Law 103–63, dated August 4, 1993 (the Spring Mountains National Recreation Area Act, 16 U.S.C. 460hhh *et seq.*), established the SMNRA to include approximately 316,000 acres (128,000 hectares) of Federal lands managed by the Forest Service in Clark and Nye Counties, Nevada, for the following purposes:

(1) To preserve the scenic, scientific, historic, cultural, natural, wilderness, watershed, riparian, wildlife, threatened and endangered species, and other values contributing to public enjoyment and biological diversity in the Spring Mountains of Nevada;

(2) To ensure appropriate conservation and management of natural and recreation resources in the Spring Mountains; and

(3) To provide for the development of public recreation opportunities in the Spring Mountains for the enjoyment of present and future generations.

The National Forest Management Act of 1976, as amended (NFMA) (16 U.S.C. 1600 *et seq.*), provides the principal guidance for the management of activities on lands under Forest Service jurisdiction through associated land and resource management plans for each forest unit. Under NFMA and other Federal laws, the Forest Service has the authority to regulate recreation, vehicle travel, and other human disturbance; livestock grazing; fire management; energy development; and mining on lands within its jurisdiction. Current guidance for the management of Forest Service lands in the SMNRA is under the Toiyabe National Forest Land and Resource Management Plan and the SMNRA General Management Plan. In June 2006, the Forest Service added the Spring Mountains acastus checkerspot butterfly and three other endemic butterflies to

the Regional Forester's Sensitive Species List in accordance with Forest Service Manual 2670.

The Forest Service's objective in managing sensitive species is to prevent listing of species under the Act, maintain viable populations of native species, and develop and implement management objectives for populations and habitat of sensitive species. Projects listed under Factor A above for the Kyle Canyon (middle) colony site have been guided by these Forest Service plans, policies, and guidance. However, removal or degradation of butterfly habitat has occurred as a result of projects approved by the Forest Service in Kyle Canyon.

Because the Spring Mountains acastus checkerspot butterfly is designated a sensitive species, Standard 0.28 of the Land and Resource Management Plan for the Spring Mountains requires a collecting permit issued by the Regional Forester (except for traditional use by American Indians) (Forest Service 1996, p. 18). Furthermore, Standard 11.6 indicates that collecting, regardless of species, in specific areas including Cold Creek, Lee Canyon, upper Kyle Canyon, and Willow Creek also requires a permit (Forest Service 1996, p. 31). These items, identified as "standards," are constraints or mitigation measures that must be followed as directed by the General Management Plan (Forest Service 1996, p. 2). Collection permits are not required for activities contracted by or performed under agreement with the Forest Service. The best available information indicates that collecting has occurred before and after the Spring Mountains acastus checkerspot butterfly was designated a sensitive species (see Factor B discussion above); however, no permits have been issued to date.

Summary of Factor D

The current existing regulatory mechanism designed to regulate the collection of Spring Mountains acastus checkerspot butterflies exists, but there are no records of permits being issued for this purpose. Despite the existence of the permitting program, collections of Spring Mountains acastus checkerspot butterfly and other species of butterflies have taken place without permits being issued. We are unable at this time to determine the current population abundance or trends for the Spring Mountains acastus checkerspot butterfly. We concluded that collection is not a threat to the subspecies. Therefore, we cannot conclude that existing regulatory mechanisms regarding collection are inadequate. However, because butterfly collection is known to occur in the Spring Mountains, we will work with the Forest Service to enhance the effectiveness of their permitting program and continue to monitor abundance and collection efforts. After reviewing the best available commercial and scientific information, we conclude that the inadequacy of existing regulatory mechanisms is not currently a threat to the Spring Mountains acastus checkerspot butterfly, nor is it likely to become so because our analysis under the other Factors concluded that there are no significant threats to the species.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Drought at All Sites

Drought is variously defined depending upon the temporal and spatial scales of interest (Heim 2002, p. 1150; Passioura 2007, p. 113). We consider drought in the context of reduced water availability that would affect Spring Mountains acastus checkerspot butterfly larval host and nectar plants at a magnitude sufficient to cause a decline in the population. Climate models

show the southwestern United States has transitioned into a more arid climate of drought that is predicted to continue into the next century (Seager *et al.* 2007, p. 1181).

Reductions in butterfly populations due to drought have been observed (Ehrlich *et al.* 1980, pp. 101–105; Thomas 1984, p. 344). In 2006, populations of many butterfly species were at low levels throughout southern Nevada, south of the Great Basin, likely as a result of drought conditions (Murphy 2006, p. 3). In 2007, other species of butterflies in the Spring Mountains experienced population declines, and these declines were hypothesized to be a result of drought (DataSmiths 2007, p. 22). Because other species of butterflies in the Spring Mountains experienced declines thought to be associated with drought, we believe that drought could affect the Spring Mountains acastus checkerspot butterfly similarly. However, we do not have information about Spring Mountains acastus checkerspot butterfly abundance trends as they relate to drought occurrences in order to determine at this time if drought may affect the subspecies now or in the future.

The Spring Mountains acastus checkerspot butterfly's larval host plant, *Chrysothamnus viscidiflorus*, is classified as having a “high” drought tolerance (USDA Natural Resources Conservation Service (NRCS) 2011); however, certain soil characteristics, such as loam (a soil consisting of a mixture of varying proportions of clay, silt, and sand), can reduce its tolerance to drought (Sperry and Hacke 2002, p. 367). We do not have information on where such soil characteristics occur in the Spring Mountains and whether they occur in Spring Mountains acastus checkerspot butterfly habitat. Additionally, *C. viscidiflorus* is at a competitive disadvantage for limited early spring moisture because of its low leaf area (Miller 1988, p. 62).

Drought can cause butterfly host plants to mature early, which can reduce larval food availability (Ehrlich *et al.* 1980, pp. 101–105; Weiss 1987, p. 165). The available information about drought does not indicate that Spring Mountains acastus checkerspot butterfly host plants are maturing early and therefore reducing larval food availability for the subspecies. Therefore, we cannot speculate about the effects of drought on the Spring Mountains acastus checkerspot butterfly.

Precipitation during the growing season for *Chrysothamnus viscidiflorus* (April through July) has exhibited an overall decline during the last decade at three climate stations in and around the Spring Mountains (Service 2011c, pp. 1–3). The Spring Mountains acastus checkerspot butterfly population may be experiencing drought conditions associated with this decline in precipitation. However, because the larval host plant is drought-tolerant and the available information does not indicate how individual Spring Mountains acastus checkerspot butterflies may be impacted by drought, we have determined that, based on the best available scientific and commercial information, drought is not a threat to the subspecies at this time, nor is it likely to become a threat in the future.

Small Populations

Populations with small numbers of individuals have a higher risk of extinction than populations with large numbers of individuals due to random environmental events (Shaffer 1981, p. 131; Gilpin and Soule 1986, pp. 24–28; Shaffer 1987, pp. 69–75). The number of surveyed individuals of Spring Mountains acastus checkerspot butterflies has remained small over the last 5 years (Table 2); however the available information does not indicate that historical

or recent population size for the Spring Mountains acastus checkerspot butterfly have declined such that small population size may be a threat to the subspecies now, nor is it likely to become so in the future.

We are unable at this time to determine with any certainty the current population abundance or trends of the Spring Mountains acastus checkerspot butterfly. At the four sites where survey data exist, it appears that abundances have consistently been low. Surveying for butterflies may pose difficulties because of low densities, limited resources, route considerations, surveyor experience, and varying weather conditions (Zonneveld *et al.* 2003, pp. 476–486). On the basis of a review of the available information and given the uncertainty about abundance and trends, we cannot conclude that small population size is a threat to the subspecies at this time, nor does available information indicate it is likely to become so in the future.

Vehicle and Hiking Traffic at the Griffith Peak Trail/Harris Spring Road/Harris Mountain Road Colony Site

One researcher has hypothesized that disturbance by vehicle and hiking traffic may threaten the Griffith Peak Trail/Harris Spring Road/Harris Mountain Road colony site as a result of direct disturbance to the butterflies by vehicles and hikers (Boyd 2009, pp. 3–4). Vehicles and hikers could affect Spring Mountains acastus checkerspot butterflies by altering the behavior of the butterflies and causing adult mortality from crushing or collision. Road and trail use are likely to continue into the future. The Harris Spring Road leads to Harris Mountain Road, where Spring Mountains acastus checkerspot butterflies have been observed (Boyd and Austin 2001,

Figure 1). This is a rough gravel road with switchbacks that restrict vehicle speeds. Visitor use during weekdays is low (Service 2011, p. 1), but likely increases on the weekends. Mortality caused by crushing or collision with vehicles would likely be rare because vehicles are unlikely to attain speeds beyond those that butterflies could escape from. Exposure of Spring Mountains acastus checkerspot butterflies to disturbance from hikers is insignificant because the best available data indicate that disturbance is sporadic and limited, allowing sufficient time for mating to occur. Studies of sagebrush checkerspot butterflies have shown that they have a high breeding success (Shields 1967, pp. 90 and 123; Rhains 2010, pp. 212–213), and Spring Mountains acastus checkerspot butterflies are likely similar. After females mate, they disperse to oviposit, apparently away from the colony site breeding areas (Boyd and Austin 2001, p. 6; Boyd and Austin 2002, p. 5). Disturbance by vehicles and hikers is localized, ongoing, and low in intensity. Exposure of Spring Mountains acastus checkerspot butterflies to these activities is insignificant based upon our review of the best available information. Therefore, we have determined that disturbance from vehicles and hikers is not a threat to the Spring Mountains acastus checkerspot butterfly now, nor is it likely to be a threat in the future.

Summary of Factor E

Drought has occurred and is expected to continue throughout the range of the Spring Mountains acastus checkerspot butterfly and may negatively impact the subspecies. However, the larval host plant is drought-tolerant, and the available information does not indicate that individual Spring Mountains acastus checkerspot butterfly populations have been impacted by drought such that drought is a threat to the Spring Mountains acastus checkerspot butterfly now,

nor is it likely to become a threat in the future. The available information does not indicate that small population size is a threat to the subspecies at this time, nor is it likely to become so in the future given the uncertainty about abundance and number of colonies. In addition, the available information indicates that disturbance from vehicles and hikers is not a threat to the Spring Mountains acastus checkerspot butterfly because disturbance by vehicles and hikers is localized, ongoing, and low in intensity. Based on our review of the best available scientific and commercial information, there is no indication that other natural or manmade factors are a threat to the subspecies at this time, nor are they likely to become so in the future.

Cumulative Effects from Factors A through E

We considered whether there may be cumulative effects to the Spring Mountains acastus checkerspot butterfly from the combined impacts of potential threats such that even if each threat individually does not result in population-level impacts, that cumulatively the effects may be significant. We considered whether the combined effects of fire suppression, collection, climate change, and small population size may result in a significant impact to the Spring Mountains acastus checkerspot butterfly. At this time, given the complex and uncertain nature of effects associated with climate change and the uncertainties associated with information on the abundance and population trends of the Spring Mountains acastus checkerspot butterfly, the best available information does not indicate that synergistic interactions between climate change and the other potential threats (fire suppression, collection, and small population size) will impact the Spring Mountains acastus checkerspot butterfly. Even though each of these potential threats may result in an impact to the Spring Mountains acastus checkerspot butterfly, the best available

information does not indicate that synergistic effects between fire suppression, collection, climate change, and small population size are unlikely to result in a significant overall population impact to the Spring Mountains acastus checkerspot butterfly now, nor are they likely to do so in the future.

Finding

As required by the Act, we considered the five factors in assessing whether the Spring Mountains acastus checkerspot butterfly is an endangered or threatened species throughout all of its range. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the Spring Mountains acastus checkerspot butterfly. We reviewed the petition, information available in our files, other available published and unpublished information, and we consulted with recognized Spring Mountains acastus checkerspot butterfly experts and other Federal agencies.

The term "threatened species" means any species (or subspecies or, for vertebrates, distinct population segments) that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act does not define the term "foreseeable future." However, it likely describes the extent to which the Service could reasonably rely on predictions about the future in making determinations about the future conservation status of the species.

In considering the foreseeable future as it relates to the status of the Spring Mountain Acastus butterfly we considered the best available scientific and commercial historical and current data to identify any existing trends or indications that conditions are likely to change in the future. We considered how current stressors are affecting the species and if that information indicates any changes in those stressors in the future. Thus the foreseeable future includes consideration of the ongoing effects of current stressors and whether there are likely to be any changes in the stressor in the future that will result in population level effects.

Based on our review of the best available scientific and commercial information pertaining to the five factors, we find that the stressors to the subspecies or its habitat are not of sufficient imminence, intensity, or magnitude to indicate that the Spring Mountains acastus checkerspot butterfly is in danger of extinction (endangered), or likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range. While the best available information indicates that survey numbers are low, it does not suggest a significant change in distribution or abundance of the Spring Mountains acastus checkerspot butterfly. Further, the best available information does not indicate that any threats are acting on the subspecies. Fire suppression has impacted other butterfly species in the Spring Mountains, but the best available information does not indicate that the larval host plant for the Spring Mountains acastus checkerspot butterfly has been reduced in abundance and distribution as a result of fire suppression. Additionally, while we are aware of butterfly collection in the Spring Mountains, the best available information does not indicate that population abundances of the Spring Mountains acastus checkerspot butterfly are being negatively impacted by collection. We are currently working with the Forest Service to address collection permitting and prohibitions to

avoid any potential future threats that could occur from collection. Additionally, the best available information does not indicate that any of these stressors are likely to change such that they are likely to have population level impacts on the subspecies in the future. Therefore, we find that listing the Spring Mountains acastus checkerspot butterfly as an endangered or threatened species is not warranted throughout all of its range at this time.

Significant Portion of the Range

Under the Act and our implementing regulations, a species may warrant listing if it is an endangered or threatened species throughout all or a significant portion of its range. The Act defines “endangered species” as any species which is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species which is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The definition of “species” is also relevant to this discussion. The Act defines “species” as follows: “The term ‘species’ includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.” The phrase “significant portion of its range” (SPR) is not defined by the statute, and we have never addressed in our regulations: (1) The consequences of a determination that a species is either endangered or likely to become so throughout a significant portion of its range, but not throughout all of its range; or (2) what qualifies a portion of a range as “significant.”

In determining whether the Spring Mountains acastus checkerspot butterfly is an endangered or threatened species in a significant portion of its range, we first addressed whether any portions of the range of the Spring Mountains acastus checkerspot butterfly warrant further consideration. We evaluated the current range of the Spring Mountains acastus checkerspot butterfly to determine if there is any apparent geographic concentration of the primary stressors potentially affecting the subspecies. We found the stressors are not of sufficient imminence, intensity, or magnitude, and are not geographically concentrated such that it warrants evaluating whether a portion of the range is significant under the Act.

We do not find that the Spring Mountains acastus checkerspot butterfly is in danger of extinction now, nor is likely to become endangered within the foreseeable future, throughout all or a significant portion of its range. Therefore, listing the Spring Mountains acastus checkerspot butterfly as an endangered or threatened species under the Act is not warranted at this time.

We request that you submit any new information concerning the status of, or threats to, the Spring Mountains acastus checkerspot butterfly to our Nevada Fish and Wildlife Offices (see **ADDRESSES** section) whenever it becomes available. New information will help us monitor the Spring Mountains acastus checkerspot butterfly and encourage its conservation. If an emergency situation develops for the Spring Mountains acastus checkerspot butterfly or any other species, we will act to provide immediate protection.

References Cited

A complete list of references cited is available on the Internet at *<http://www.regulations.gov>* and upon request from the Nevada Fish and Wildlife Office (see **ADDRESSES** section).

Authors

The primary authors of this notice are the staff members of the Nevada Fish and Wildlife Office and the Pacific Southwest Regional Office.

Authority

The authority for this section is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: September 19, 2012

Rowan W. Gould

Acting Director, Fish and Wildlife Service

Billing Code 4310–55–P

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